

CLAIM AMENDMENTS

1. (Amended) A low-profile vernier x-y-theta substrate chuck for mounting to the vacuum-equipped movable platform of a high-resolution stage for multi-exposure projection lithography on a substrate of greater area than the area of the substrate chuck, characterized by:

a) an x-bracket which serves as a mounting frame and has multiple supporting means and locating surfaces for other elements;

b) x-bracket adjustment means mounted on said x-bracket;

10 c) an x- y-bracket, having a slideway, mounted operatively to said x-bracket;

d) a y, theta bracket, mounted slidably in said slideway of said x-y bracket, said y, theta bracket having a central yaw shaft opening and vacuum channel;

e) a yaw shaft fitted within said yaw shaft opening;

f) y-bracket adjustment means;

20 g) a configured yaw vacuum diffuser bracket (5) having a top plane surface forming ~~defining a substrate support~~ an apron, having a number of vacuum diffuser plate support islands (14) providing a multiple support plane for a vacuum diffuser plate (7); and having a peripheral vacuum diffuser plate locating relief (25) channel, with diffuser plate support islands (14) and peripheral ~~channel~~ vacuum diffuser plate locating relief (24) having a vertical position depth appropriate for supporting the bottom surface of ~~holding~~ a vacuum diffuser plate (7) with its top surface flush with the apron top surface of said yaw vacuum diffuser bracket (5) as said a substrate support plane;

h) a vacuum diffuser plate (7), mounted to said yaw vacuum diffuser bracket (5); and

i) adjustment means, for x, y and theta adjustment while mounted on the movable platform of such ~~said~~ high resolution stage.

2. (Amended) a low-profile vernier x-y-theta substrate chuck according to claim 1, wherein said vacuum diffuser plate (7) is cemented to said vacuum diffuser plate locating support islands (14) and to said peripheral vacuum diffuser plate locating relief (25) channel with the -its
10 top surfaces of said vacuum diffuser plate (7) and the apron top surface of
said yaw vacuum diffuser bracket (5) co-planar at said substrate support
plane.

3. (Amended) A low-profile vernier x-y-theta substrate chuck according to claim 1, wherein said adjustment means is operable while said substrate chuck is mounted on a ~~said~~ high resolution stage.

20 4. (Amended) A low-profile vernier x-y-theta substrate chuck according to claim ~~1~~ 3 , wherein said adjustment means includes x, y and theta adjustability operable while said substrate chuck is mounted on a ~~said~~ high resolution stage.

5. (Amended) A low-profile vernier x-y-theta substrate chuck according to claim 1, wherein said adjustment means includes separate x pre-load means and y pre-load means and x adjustment screws and y adjustment screws operable while said substrate chuck is mounted on a said high resolution stage.

6. (Amended) A low-profile vernier x-y-theta substrate chuck
10 according to claim 5 ~~4~~, wherein said adjustment means includes ~~x and y pre-load means~~ and x, y, and theta adjustment screws operable while said substrate chuck is mounted on said high resolution stage.

7. (Amended) A low-profile vernier x-y-theta substrate chuck according to claim 6 ~~4~~, wherein said adjustment means includes ~~x and y pre-load means~~ and x, y, and theta adjustment screws operable while said substrate chuck is mounted on said high resolution stage, and includes a yaw shaft (8) and a central support spring (9) for said yaw vacuum diffuser
20 bracket 5, and also includes vacuum channel pattern means (24) juxtaposed with said yaw shaft (8).

8. (Amended) A low-profile vernier x-y-theta substrate chuck having a rigid high-flatness vacuum diffuser plate (7) with its top surface co-planar with the top surface plane of a yaw vacuum diffuser bracket (5) in a substrate support plane, said ~~x~~ yaw vacuum diffuser bracket (5) having a number of vacuum diffuser plate support islands (14), a peripheral vacuum diffuser plate locating relief (25) ~~support channel~~, and means to provide x, y and theta alignment adjustment while mounted on a flat surface of area significantly greater than its area, made by the following method:

10 Step 1. Dispensing a bead of epoxy cement (24) in the peripheral ~~channel~~ vacuum diffuser plate locating relief (25) and dispensing beads of epoxy cement on tops of the islands (14);

Step 2. Placing a vacuum diffuser plate (7) within said peripheral ~~channel~~ vacuum diffuser plate locating relief (25) of said ~~x~~ bracket with sufficient force to deform said beads of epoxy cement so as to make a pre-assembly with the top surface of said vacuum diffuser plate (7) and top surface of said yaw vacuum diffuser bracket (5) plane non-co-planar;

20 Step 3. Flipping the pre-assembly over onto a high-flatness rigid surface plate;

Step 4. Shaking said pre-assembly to co-planar juxtaposition of the vacuum diffuser plate (7) and top surface of said yaw vacuum diffuser bracket (5); ~~plane of the x-bracket~~; and

Step 5. Letting the epoxy cement (24) cure.

9. (New) An alignable, low-profile substrate chuck for patterning an indeterminate number of substrate panels, one at a time, adjustable in x, y and theta while on the movable platform of a stage,

comprising:

an x-bracket (1);

an x, y – bracket (2) mounted movably to said x-bracket (1) and having a slideway (26);

10 a y, yaw bracket (3) mounted slidably in said slideway (26) of said x, y –bracket (2), having a central yaw shaft opening for a yaw shaft (8) and vacuum channel (27);

a yaw bracket (4) mounted in said slideway (26) and carrying a yaw shaft (8) with a vacuum channel (27);

a vacuum diffuser plate (7);

a yaw vacuum diffuser bracket (5) with a top surface forming an apron, configured with a peripheral vacuum diffuser plate locating relief (25) and a plurality of support islands (14) together providing positioning for said vacuum diffuser plate (7) with its top surface flush with such apron defining a substrate support plane; and

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x, y and theta adjustment means.